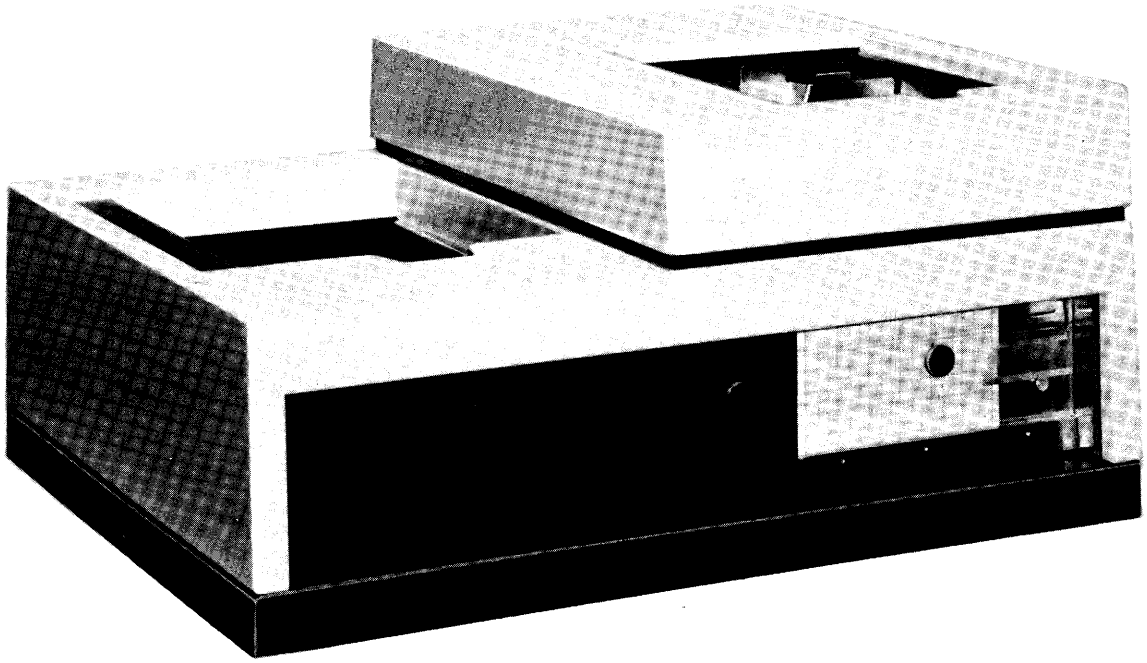
682—100 INTEGRATED CARD READER



This publication is a hardware description of the integrated card reader. While the information it contains may be helpful to the programmer or operator, it is not intended as a substitute for the NCR Century Series programming or operating manuals.

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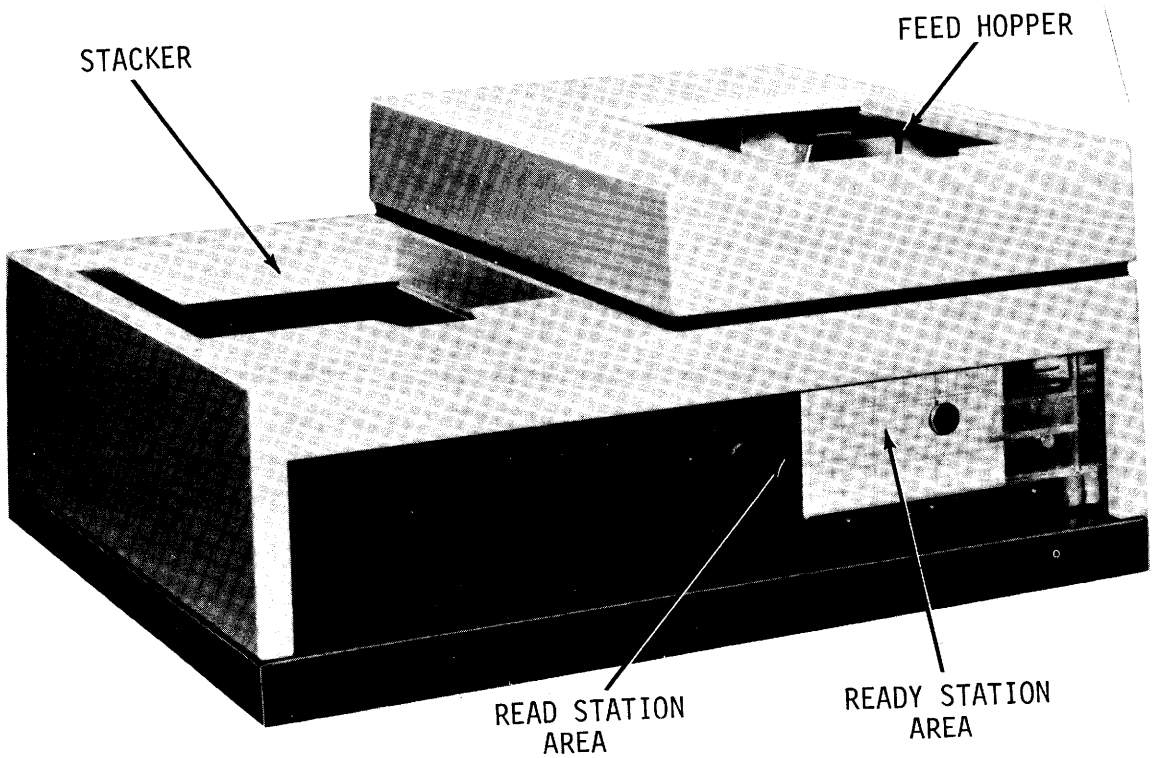
PHYSICAL DESCRIPTION

The 682-100 reads industry-standard, 80-column cards, including round-cornered cards, at a maximum rate of 300 cards per minute. The following illustration indicates the relative location of the reader's principal components.



FEED HOPPER

The 1000-card capacity feed hopper has been designed specifically to simplify card loading. Cards are loaded into the hopper face forward, with the 9-edge down, and held in position for feeding by a pressure plate. A built-in sensing switch in the hopper detects card presence.

READY STATION

The ready station aligns each card before it is moved through the read station, reducing the demand time for reading.

READ STATION

Photocells in the optical reading station sense the punches in the card. The output from these photocells is transmitted to the processor where the 12-column configuration is translated into an 8-bit code (See CODE TRANSLATION).

Cards are read one column at a time, beginning with column 1. As a card passes through the read station, the reader generates a timing signal for each column and for the end of the card, permitting logical interface of the reader to the processor. Additional timing is provided to permit an on/off (light/dark) check of the optical reading elements between cards.

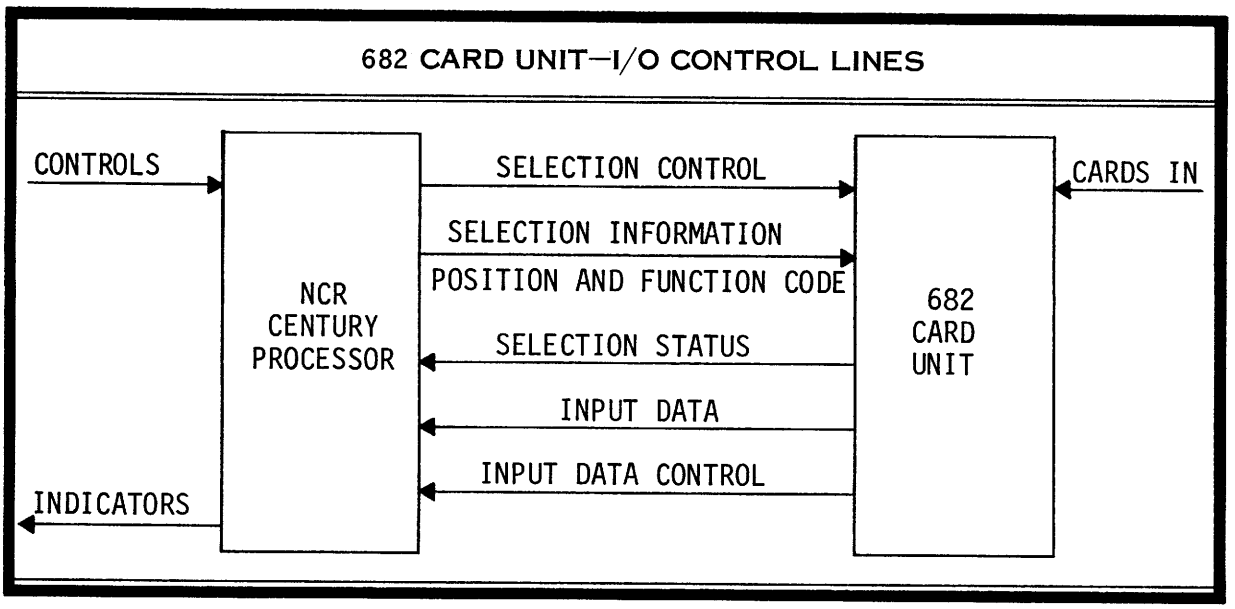
STACKER

The 1000-card capacity stacker collects cards that have passed through the read station and positions them in the order in which they were placed in the feed hopper. A built-in switch signals the processor when the stacker becomes filled to capacity. When this happens, the card currently at the read station is processed, so that no data is lost; however, the next selection attempt folling the full stacker condition results in the transmission of an inoperative status. This status remains in effect until cards are removed from the stacker.

TRANSPORT

The transport mechanism moves cards from the feed hopper, through the ready and read stations, to the stacker. Each time the processor selects the reader, or the operator presses the FEED switch, the card is moved one complete position.

Cards are kept under positive control of the transport mechanism at all times to minimize jams.



FUNCTIONAL DESCRIPTION

I/O REQUIREMENTS

Input/output operation in any NCR Century system may be separated into three parts: peripheral selection, data transfer, and peripheral termination. For a detailed description of NCR Century I/O operation, refer to the Processor publications in this manual under the Processors tab.

Peripheral Selection

An I/O operation begins with the ALU selecting the peripheral unit, using information specified by the INOUT command. Selection of the 682-100 requires only a 1-character PAF (Peripheral Address Field) to designate trunk and position number. No function code is required since selection initiates reading. A function code may be provided for upward programming compatibility, but it

will have no effect on the reader. The trunk and position to which the integrated card reader is assigned depends upon the processor being used (see the appropriate processor publication in this manual under the Processors tab).

When the peripheral responds to the processor, an S2 status character is stored to indicate the result of the attempted selection:

S2 STATUS CHARACTERS

CHARACTER	NAME	MEANING
10000000	BUSY	The trunk or the unit is in use.
10000010	STANDBY	The reader has been placed in a standby state by the operator.
00000010	INOPERATIVE	Hopper empty, stacker full, card jam, misfeed, or no card in ready station.
01000000	COMMAND INITIATED	All operating conditions satisfied, paf accepted.

System software then examines the S2 character and takes whatever action is required.

Data Transfer

Once the I/O operation has been successfully initiated, the ALU resumes internal processing operations, leaving the I/O Control in charge of data transfer. When the 682 is ready to transmit a character, it sends a request for service and its unit response number to the I/O Control. The I/O Control uses the response number to locate control word 0, which is permanently assigned to the integrated card reader, and stores the incoming character at the address specified by the NA portion of the control word. This process continues until the designated memory area is filled, column 80 is read, or the unit deselects for any reason.

I/O Termination

I/O termination occurs when the peripheral is deselected or deselects itself. The peripheral is normally deselected by a processor-terminate signal when the specified memory area is filled. The unit deselects itself when:

- The end-of-card is detected.
- The STOP switch is pressed.
- The unit becomes inoperative for any reason.

At termination, a second status character is stored in the first byte of the control word to indicate the condition of the I/O operation. As soon as this character is stored, the I/O control turns on a hardware flag indicating that

the operation has terminated. The main program flow is interrupted at a logical point and enters an I/O termination routine where software examines the status character and takes appropriate action. This second status character may be either an S3 or an S4 character, depending upon the result of the operation.

- S3 Status Character

There are five possible S3 characters involved in the operation of the integrated card reader:

S3 STATUS CHARACTERS

CHARACTER	NAME	MEANING
00000010	INOPERATIVE	Card jam, misfeed, or other malfunction.
00001000	MEDIA	Last card in hopper has been fed.
00000000	OPERATION COMPLETE	Read operation completed with no errors occurring.
00100001*	MULTIPLE PUNCH ERROR	Multiple punches were detected in rows 1-7 of the last card read.
00100010*	REGISTRATION ERROR	The last card read was not properly registered in the read station.

* Applicable to the NCR Century 101 System only.

The S3 inoperative status is transmitted when the reader becomes inoperative after selection and prior to normal termination. The operator must examine the reader to determine the cause of the inoperative condition. Hopper empty, stacker full, and card jam are obvious causes. A misfeed is less obvious, but is recognized by the absence of a card at the ready station when there is at least one card in the feed hopper. Jam conditions are discussed in the OPERATION section of this publication.

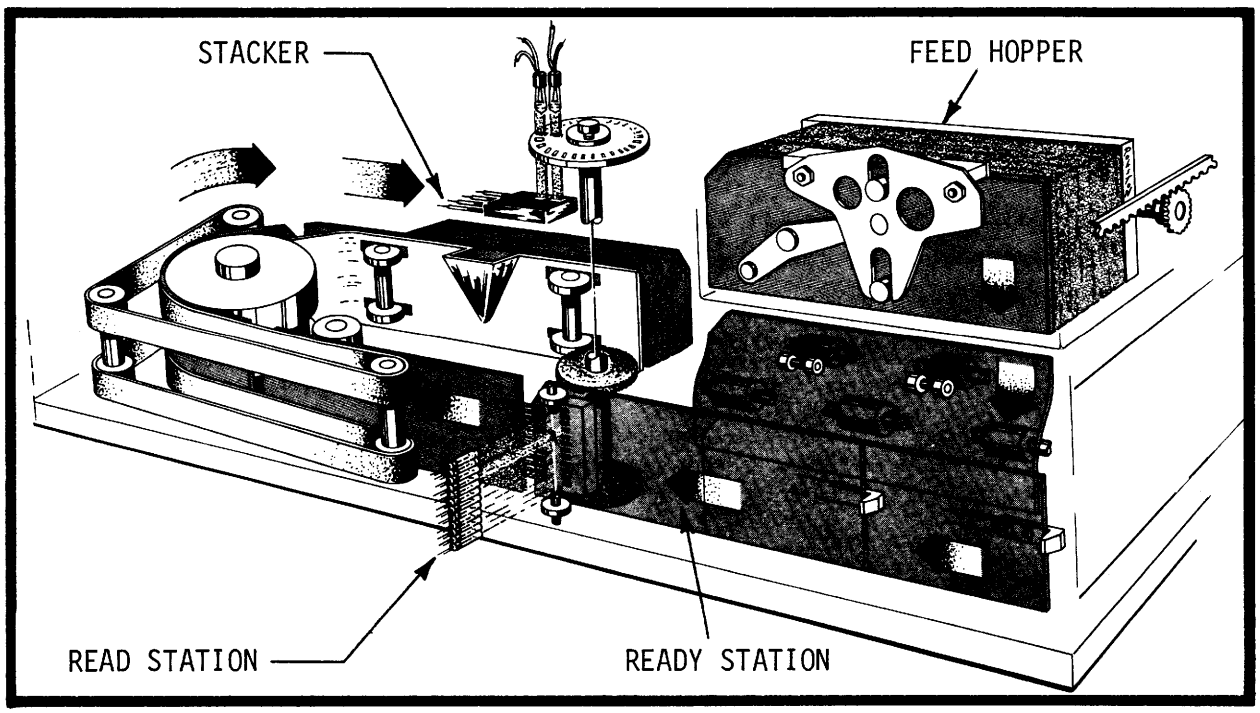
- S4 Status Character

When the I/O control detects a latent error (NCR Century 101 and larger systems), it stores an S4 status character in the S portion of the peripheral control word; it also signals the peripheral to stop sending data, inhibits the S3 status character, and causes the peripheral to deselect.

There are two possible S4 status characters:

S4 STATUS CHARACTERS		
CHARACTER	NAME	MEANING
10000100*	LATENT ME	A memory error has been detected by the I/O control.
10001000*	LATENT PE	A program error has been detected by the I/O control.
*NCR Century 101 and larger systems only.		

682-100 FUNCTIONAL OPERATION



Each time the integrated card reader is selected, the unit completes one cycle as follows:

1. The card in the read station moves between the light source and the photoelectric read cell then into the stacker. As each column moves past the cell, the punch configuration is transmitted to the integrated card reader control over twelve data lines.

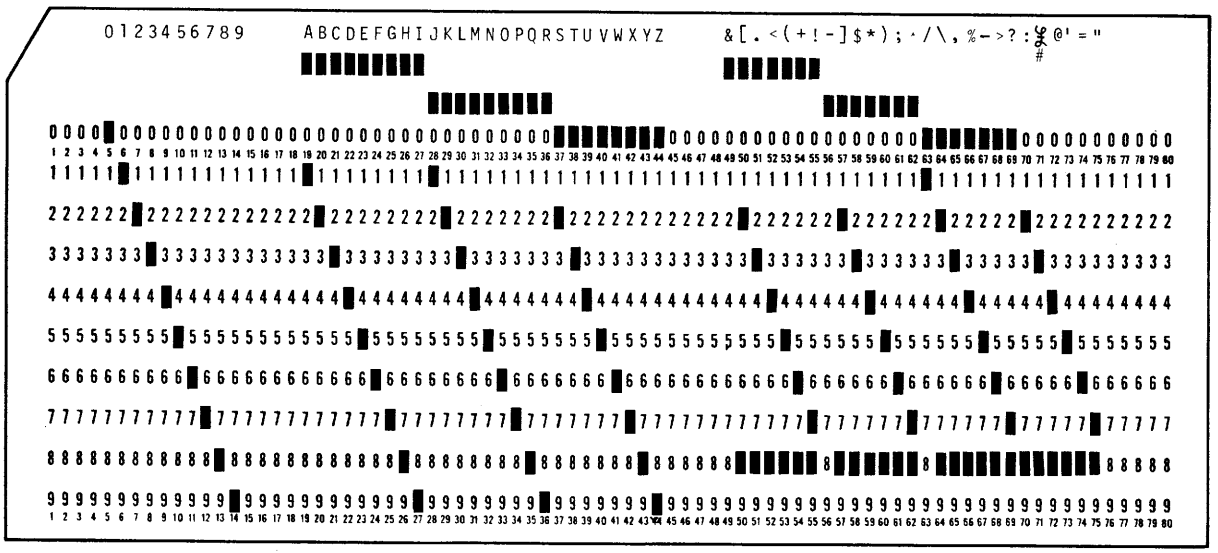
2. The card in the card ready station is moved to the read station. If no card is present at either the read station or the ready station when the unit is selected, an S3 inoperative status is sent to the CPU. If there is a card at the read station, but none at the ready station at the time

of selection, the command initiated S2 character for that card is sent to the CPU. Any attempt to reselect the unit, however, results in the transmission of an S2 inoperative character.

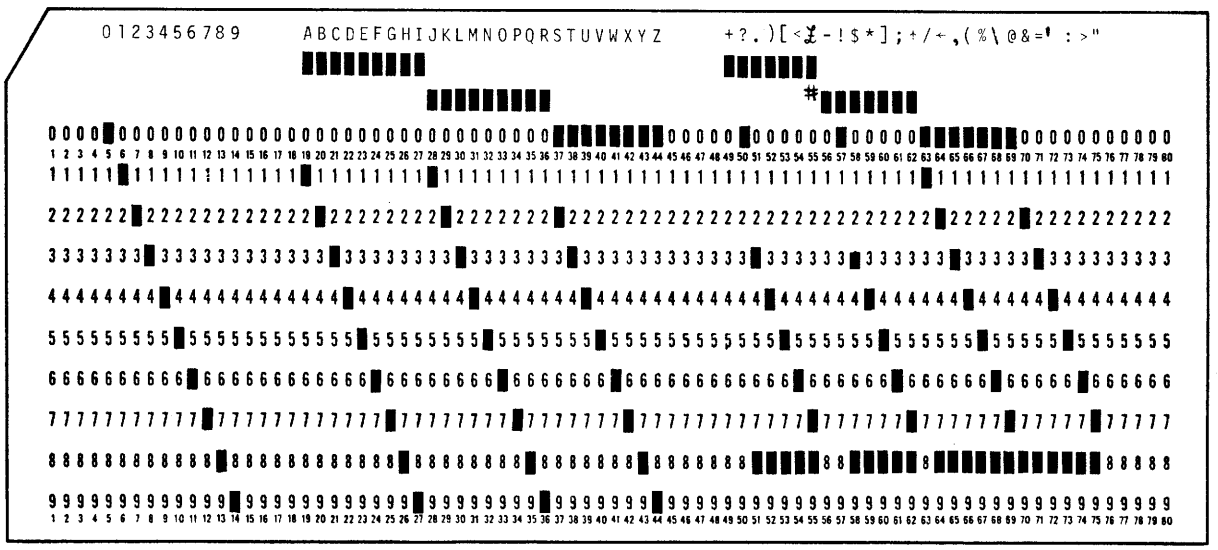
3. A card is fed from the feed hopper to the ready station. If there is no card in the feed hopper, but there is one at the read station, the S3 media character is sent to the processor after the last card has been read.

CODE TRANSLATION

The 682-100 reads cards punched in Hollerith Extended A Set and Extended H Set codes. The Extended A Set consists of the 64 characters illustrated:

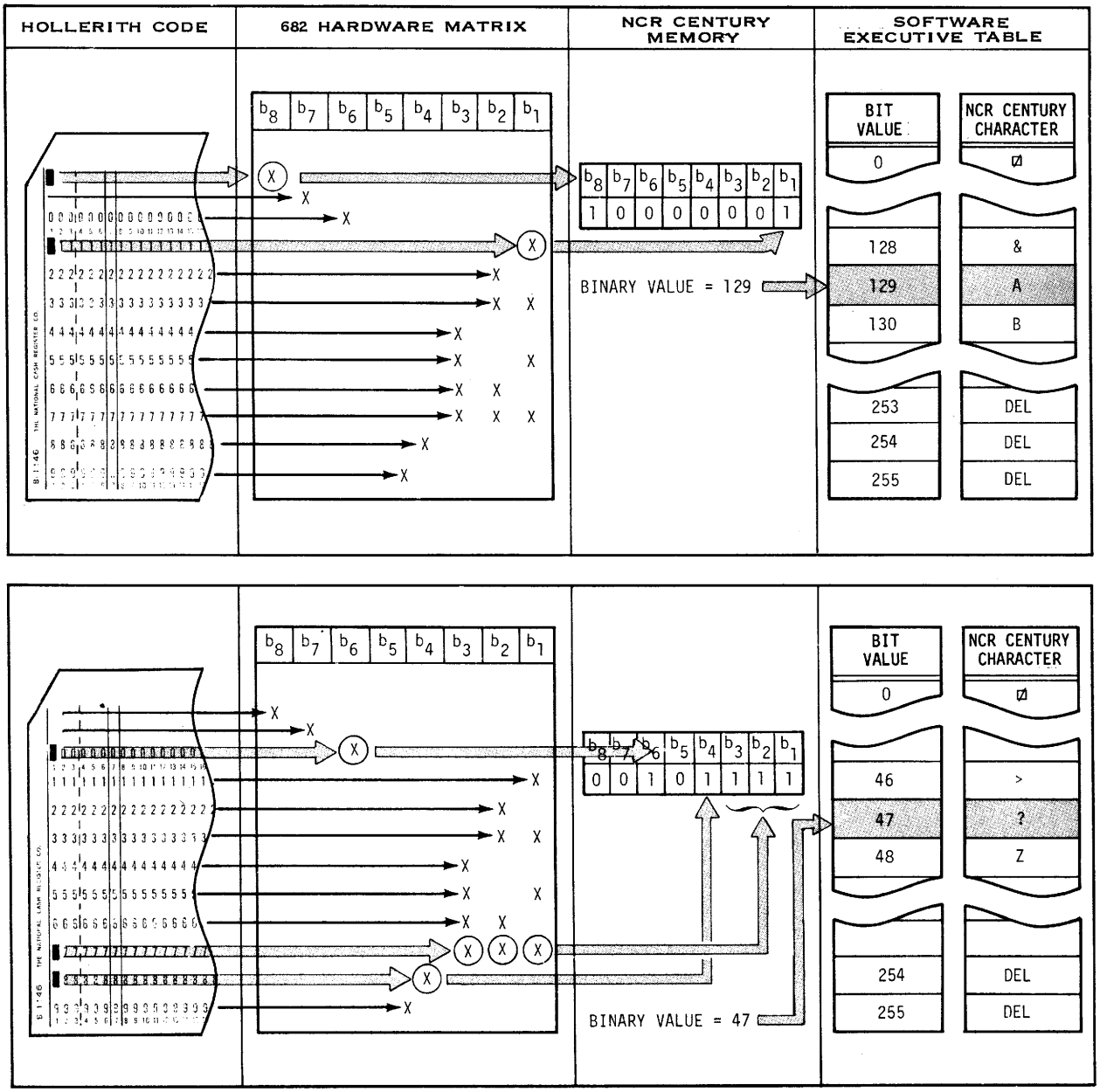


The Hollerith Extended H Set has the same characters as the Extended A Set, but different punch configurations for the special symbols:



In the Hollerith Extended A Set and Extended H Set codes, only one punch is acceptable in rows 1 through 7 of any column. A column may, however, have rows 12, 11, 0, and 8 punched as well as a single punch in rows 1 through 7. If there is more than one punch in rows 1 through 7, the data cannot be read properly; an S3 multiple punch error status is sent to the processor (NCR Century 101 only).

Translation between Hollerith and NCR Century codes is accomplished in the processor through a combination of hardware and software decoding techniques. In the course of this operation, a hardware matrix reduces the 12-row punched card code to an 8-bit binary configuration. The software I/O Executive then converts the binary value of this configuration into an NCR Century character by means of a 256-character translation table:



682-100 SPECIFICATIONS

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Since the 682-100 is an integrated peripheral, its physical and environmental specifications fall within the specification range of the basic system with which it is used.

MEDIA STORAGE

Cards to be read must be stored in an environment that is the same as the system operating environment for at least 48 hours prior to processing.

OPERATION

CONTROLS AND INDICATORS

The controls for the integrated card reader are located on the processor console in the area labeled READER.

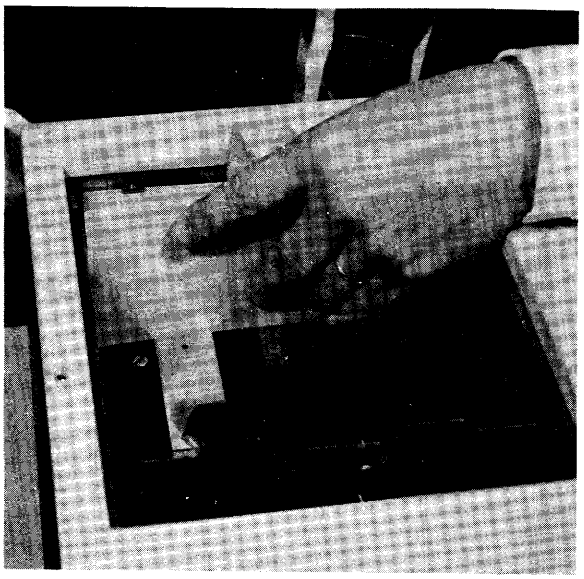
INDICATOR AND SWITCH	FUNCTION
ON/OFF POWER	Controls power to the drive motors. The Power indicator remains lighted while power is on.
CHECK RESET	The check indicator lights when the read mechanism fails a light/dark check. Press the reset switch to turn off the check indicator and reset the error check circuitry. The start switch must then be pressed to place the unit back in the ready state. If the CPU attempts to select the unit while the check indicator is on, software will generate a console display to guide the operator.
READY START	When all conditions for operation are met, pressing the start switch places the unit in the ready state for selection by the CPU. The ready indicator remains lighted while the unit is in the ready state and is turned off if the stop switch is pressed or the unit becomes inoperative for any reason.
STANDBY STOP	Pressing the stop switch places the unit in the standby state, causing the standby incicator to light. If the switch is pressed during a read operation, the reader finishes processing the card before entering the standby state.
FEED	The feed switch, which is inoperative when the reader is in the ready state, sends a card through one step in the transport cycle each time it is pressed. When cards are fed through the reader in this manner, data is not transmitted to the processor.

FUNDAMENTAL OPERATIONS

During a typical operation of the integrated card reader, the operator must load cards, initialize the unit and transfer control to the processor, and unload cards that have been read. A detailed description of card reader operation within a system context is contained in the NCR Century Operators Information Manual.

Loading Cards

1. Riffle the deck to break up any adhesion between cards.
2. Jog the deck against a flat surface to align the edges.
3. Move the pressure plate to the rear of the feed hopper.
4. Place the cards in the feed hopper face forward, 9-edge down, making sure that the first cards slide under the two spring-loaded guides.
5. Move the pressure plate forward against the last card in the deck.



Cards may be added during operation provided the unit is first placed in a standby state.

Initializing the Unit and Transferring Control to the Processor

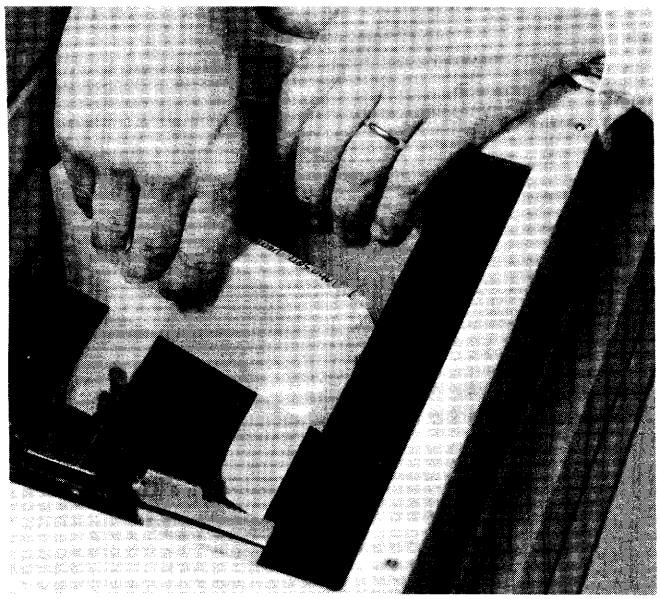
1. Press the ON/OFF switch to turn on the drive motors.
2. Press the FEED switch once to move the first card to the read station.
3. Press the START switch to place the unit in the ready state. The STANDBY indicator will be turned OFF and the READY indicator will light.

If the processor attempts to select a unit that is not in the ready state, system software generates a console display message to direct the operator.

Once the unit is placed in the ready state, it remains ready unless:

- The input hopper is empty and the last card has been read.
- The input hopper is not empty, but a card fails to feed from the hopper to the ready station.
- The stacker becomes filled.
- The unit fails a light/dark check because of a burnt-out bulb, a defective photocell, card dust in the read station, or a jam.
- The operator presses the STOP switch.

Unloading Cards



1. Latch the pressure plate at the rear of the stacker, keeping pressure on the pack with one hand.

2. Lift out the desired number of cards, maintaining pressure on those that remain.

3. Unlatch the pressure plate and either position it behind any remaining cards or return it to its normal "empty" position.

Cards may be removed from the stacker while the reader is operating.

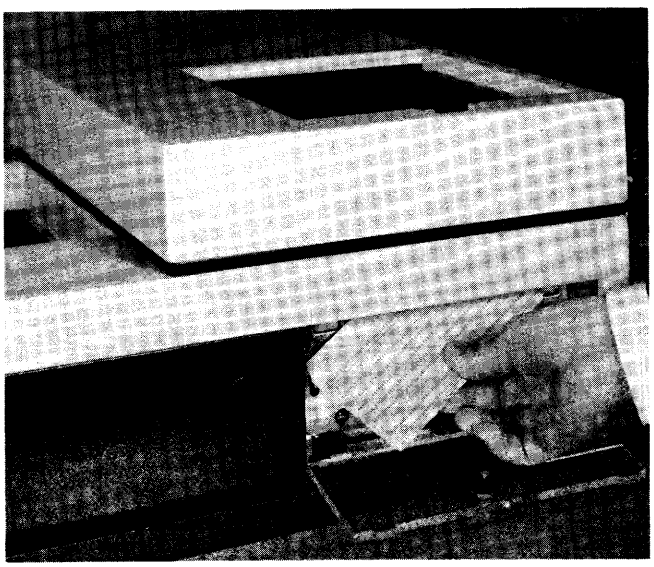
JAMS

The reader is taken out of the ready state when a card jam occurs. The operator must turn off the reader, and locate and clear the jam. He must then turn the reader back on and press the START switch to place the unit back in the ready state.

NOTE

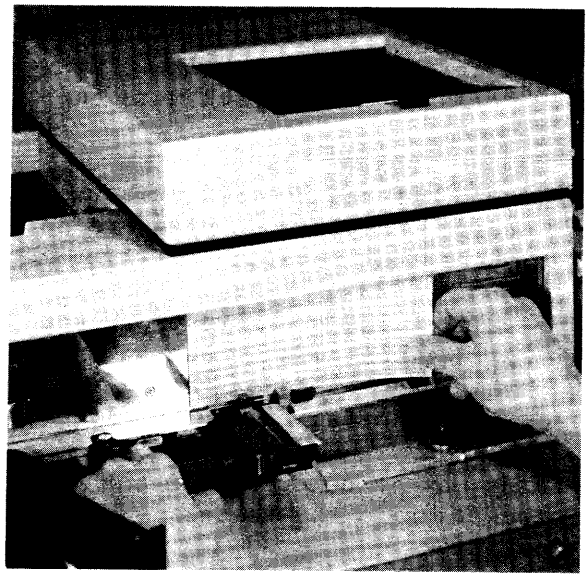
If a card jams before entering the read station, any card partially through the read station (or the last card to enter the output stacker if there is no card at the read station) must be reprocessed. A card jammed in the read station itself must be reprocessed. If the jam occurs after a card has been completely read, an S3 inoperative status is sent to the processor when the reader is reselected.

Normally if the jam occurs between the input hopper and the ready station, the ready station door opens automatically, allowing the operator to slide the card out.



If the jam occurs in the read station:

1. Open the ready station door.
2. Open the stacker door.
3. Swing down the read station photocell lamp block.
4. Press the card release lever and remove the card.
5. Move the lamp block back until it snaps into position.
6. Close the stacker and ready station doors.



OPERATOR MAINTENANCE

At the beginning of every 8-hour shift, clean card dust from the glass surfaces that protect the read lamp and photocell assemblies. Normally, wiping these surfaces with a dust free cloth is sufficient; however, the cloth may be dampened with a nonpowdering glass cleaner. Never spray glass cleaner directly on the surfaces to be cleaned. Take care not to leave fingerprints on the surface.

Clean card dust out of the feed hopper and stacker.